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Title of the Manuscript

Aging in different welfare contexts:

A comparative perspective on later-life employment and health

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Abstract

Objective: We adopt a cross-national comparative perspective to assess the labor market experiences of older adults in the years leading up to and beyond the full pension age (FPA) and their association with health in diverse welfare state contexts.

Method: We work with a harmonized pooled-country dataset of 12 nations to model individuals' employment trajectories during the 10 years surrounding gender- and country-specific FPAs over the same chronological period (2004 to 2014/2015) using sequence analysis. We then analyze these trajectories' relationships with self-rated health and chronic conditions across different welfare state contexts.

Results: We find five types of later-life employment trajectories: *early retirement*, *conventional retirement*, *predominantly part-time*, *not in the labor market*, and *partial retirement*. Among other findings, our analyses indicate that *early retirement* is associated with positive health outcomes in social-democratic and corporatist countries but not in liberal and liberal-corporatist countries. For people in the *not in the labor market* trajectory, poor self-rated health is more frequent in liberal and southern, and less frequent in corporatist countries.

Discussion: The research findings illustrate the importance of both generous public benefits in old age and later-life employment trajectories for older individuals' health.

Introduction

In the context of population aging, the governments of many middle- and high-income countries have implemented policies encouraging the extension of working life beyond the full pension age (FPA) to address the rising costs of state pensions (Zajacova, Montez, & Herd, 2014). Increasing FPAs have prompted many to ask whether it will have consequences for health, however, to date, research on the link between late retirement and health has produced equivocal findings on whether extending working life enhances or damages health (van der Heide, van Rijn, Robroek, Burdorf, & Proper, 2013; Wickrama, O'Neal, Kwag & Lee, 2013). Moreover, these studies have been criticized for analyzing retirement as a discrete, one-time event at normative ages—an approach that does not reflect the changing reality of older adults' labor market participation.

Instead, scholars have stressed the need to examine later-life employment trajectories in the years leading up to and beyond the traditional FPA (Madero-Cabib, 2015; Wahrendorf, Akinwale, Landy, Matthews, & Blane, 2017; Wahrendorf, Hoven, Head, & Carr, 2017; Worts, Corna, Sacker, McMunn, & McDonough, 2016). The findings from these studies clearly show that the *conventional retirement transition*—that is, a one-time labor market exit at the FPA after working in a long-term, full-time job—is not the norm for men and women in many countries. Today, people increasingly follow *unconventional retirement paths*: that is, working full-time or part-time beyond the FPA, partially retiring from the labor force by gradually reducing the number of working hours, often leading to late retirement, unretiring, or coming back to the labor force after retirement, or moving constantly in and out of the labor market (Calvo, Madero-Cabib, & Staudinger, 2018; Platts et al., 2017; van der Horst, Lain, Madero-Cabib, Calvo, & Vickerstaff, 2017).

However, the links between the diverse patterns of later-life employment and subsequent health outcomes are not well understood. While the importance of work and retirement for health has long been acknowledged, to the best of our knowledge, only three studies—all conducted in the United States (US)—have focused on older people's labor market experiences and health outcomes,

indicating the need for a more nuanced understanding. Concretely, first, McDonough and colleagues (2017) found that downshifting from full- to part-time work at the FPA was associated with the most favorable self-rated health among American men. Second, Azar and colleagues (2019) observed that a gradual retirement from the labor force was associated with fewer limitations when performing activities of daily living in old age. Third, Diaz-Toro and colleagues (2018) found that individuals who exited the labor force before or around the FPA were more likely to experience heart disease and stroke in their 70s than those who extended working life beyond the FPA.

Later-life employment pathways vary cross-nationally due to differences in key aspects of countries' welfare state provisions, such as old-age pension systems, labor market structures, and institutionalized family roles (Worts et al., 2016). This heterogeneity provides an opportunity to understand the links between work patterns in old age and subsequent health outcomes. Yet, to date, no comparative research of this kind has been conducted. Specifically, while the welfare state literature provides compelling evidence that state policies and provisions can play a key role in shaping population health (Clarke & Smith, 2011; McEniry, Samper-Ternent, Flórez, Pardo & Cano-Gutierrez, 2018), less is known about whether and how such contextual factors shape patterns of work/retirement and their associations with health.

Our paper, therefore, addresses two key research questions: (i) What are the main later-life employment trajectories during the years surrounding the FPA across countries with different welfare state regimes? (ii) Do the relationships between these trajectories and health, net of health selection, vary by welfare state regime? To address these questions, we analyzed the employment trajectories of individuals from 12 countries during the same phase of their life course (the 10-year period around the FPA) over the same chronological period (2004 to 2014/2015). To achieve this, we worked with a harmonized, pooled-country dataset combining four large panel surveys on aging populations.

Why is a comparative welfare states approach needed?

Scholars have long recognized the role of the welfare state in shaping life chances, resources, health, and inequalities across the life course (Beveridge, 1942; Esping-Andersen, 1990; Korpi, 1980; Korpi & Palme, 1998; Titmuss, 1974). With regard to the relationships between later-life employment trajectories and health outcomes, the welfare state may be particularly important for at least two reasons. First, welfare states shape labor market policy related to employment attachment in later life, and second, they determine a key resource related to retirement: access to and generosity of pensions. Indeed, the welfare state plays an integral role in shaping the distribution of economic resources linked to health (Fritzell & Lundberg, 2007).

One of the most widely recognized regime typologies, Esping-Andersen's (1990) *Three Worlds of Welfare Capitalism*, distinguishes countries based largely on the extent to which they de-commodify labor (i.e., reduce citizens' reliance on the market for a living wage); the degree to which they maintain or seek to ameliorate social class differences; and the relative roles of the state, the market, and the family in the provision of welfare. Liberal countries, such as the US and Chile, tend to offer meagre or income-tested benefits and to maintain divisions between state- and market-dependent consumers. Citizens in these countries are heavily reliant on the market for a living wage. Corporatist countries, such as Germany, France, Austria, and Belgium, offer fairly generous benefits, but preserve status differentials and traditional values that place responsibility for welfare provision on the family. Finally, social-democratic countries, such as Sweden and Denmark, tend to promote the greatest equality—mainly with respect to gender and social class—through generous and universal social insurance schemes (Fritzell & Lundberg, 2007; Oesch, 2008).

Other scholars have extended and modified this typology to include a broader range of countries that do not fit well with Esping-Andersen's (1990) classification, such as southern European and liberal-corporatist welfare states. Southern European welfare states, such as Spain and Italy, are characterized by low levels of public expenditure for social security and a high reliance on family

solidarity for welfare provision, including the strong involvement of women in child and elderly care (Ferrera, 1996; Gough, 1996; Moreno, 2000). Liberal-corporatist welfare states, such as the United Kingdom (UK) and Switzerland, combine elements of liberalism, such as a large private sector, with elements of corporatism, such as status maintenance of breadwinners' earnings (Bonoli & Kato, 2004). Overall population health has been observed to be better in countries that offer greater social protection and promote equality (Brennenstuhl, Quesnel-Vallée, & McDonough, 2012). This finding has mainly been attributed to the generosity of social programs (Lundberg et al., 2008).

With respect to later-life labor market participation, until the early 2000s, there was a cross-country trend toward early exit (Hofäcker, Hess, & König, 2016). Yet, in the context of increasing international competition, countries with different welfare regimes tried to counteract this trend using different strategies. Whereas liberal countries sought to keep older workers in the labor force through market-driven training programs and low public pensions (Buchholz et al., 2009), social-democratic countries provided support for older workers to help them adapt to flexibility demands through, for instance, active labor market policies. At the same time, like liberal countries, they reduced incentives for early retirement to promote an extended working life. Finally, corporatist and southern countries continued to promote early labor market exits, partially by means of interim welfare state provisions (Buchholz, 2006).

Old-age pension regulations vary among welfare states: they are more strongly regulated by market mechanisms and based on work performance in liberal countries and more strongly based on needs in social-democratic countries, with corporatist countries falling in-between (Esping-Andersen, 1990). Accordingly, social-democratic countries like Sweden and Denmark have nearly universal pension coverage systems (Organisation for Economic Co-operation and Development [OECD], 2015; Oesch, 2008). Liberal and liberal-corporatist countries, such as the US, Chile, the UK, and Switzerland, have income-tested pension systems with low public pension benefits, whereas corporatist countries, such as Germany and France, have income-tested pension systems with

generous public benefits (Fasang, 2010; Madero-Cabib & Fasang, 2016; Oesch, 2008).

Research hypotheses

Considering the above-discussed literature, we assess five hypotheses pertaining to the association between later-life employment trajectories and health for each of the welfare states.

- *Hypothesis 1:* We expect better health outcomes for individuals in early retirement paths in social-democratic countries with more generous and universal retirement benefits than in the other welfare regimes due to the health-preserving effect of social security.
- *Hypothesis 2:* We expect that individuals in liberal countries who are out of the labor force before retiring (e.g. people dedicated to unpaid family and house responsibilities and not looking for paid work) will experience the worst health relative to those with other patterns of ongoing work because these individuals are likely to face financial precarity given the high degree of commodification and minimal social security.
- *Hypothesis 3:* We expect that individuals following ‘conventional’ retirement paths (that is, who were in full-time employment during their occupational career and quit the labor force at the FPA) experience the best health outcomes in corporatist countries with generous but not universal retirement benefits, as compared to other countries. The reason is that in these countries, individuals in said retirement path are strongly rewarded with large income-tested benefits.
- *Hypothesis 4:* In liberal-corporatist countries that combine characteristics of liberal and corporatist states, we expect better health outcomes for individuals working part-time beyond the FPA than in other countries. This is because in liberal-corporatist countries, this path provides them with better than average financial resources and still some leisure time.
- *Hypothesis 5:* In southern countries with low levels of public expenditure for social security and a high reliance on family solidarity, we expect the worst health outcomes of all countries for those

who retire early relative to those following other trajectories.

Data, Variables, & Methods

Data

To analyze later-life employment trajectories, we worked with a harmonized pooled-country dataset of 12 nations, including Austria, Belgium, Chile, Denmark, England, France, Germany, Italy, Spain, Sweden, Switzerland, and the US. To build this dataset, we used four panel surveys focused on aging populations: the Chilean Social Protection Survey (EPS, for its acronym in Spanish); the English Longitudinal Study of Ageing (ELSA); the American Health and Retirement Study (HRS); and the Survey of Health, Ageing and Retirement in Europe (SHARE). In the SHARE survey, we selected only countries that participated from the first round onwards (i.e., Austria, Belgium, Denmark, France, Germany, Italy, Spain Sweden, and Switzerland). The oldest of these surveys, the HRS, has been conducted bi-annually since 1992. The ELSA and EPS surveys began in 2002, and the SHARE survey began in 2004. The HRS has been, to some extent, a pivotal study for the rest of the surveys analyzed in this research, as many of the questions in ELSA, EPS, and SHARE are asked either exactly as they are in the HRS or in a similar manner, facilitating cross-national comparisons.

We used two main criteria to select our research sample. The first criterion was that individuals had to be five years younger than their gender- and country-specific FPA in the baseline observation year 2004 (see the first page in Supplementary Material for an in-depth explanation of the survey waves used to examine employment trajectories). We considered the gender- and country-specific FPAs from 2009 (i.e., five years after 2004) based on official information from that year's OECD (2009) *Pension at Glance* report. The second criterion was that the individuals should have valid information on labor force status across the whole observation period of interest: that is, the 10-year period from 2004 to 2014/2015 (see Supplementary Table 1). We tolerated individuals with a

maximum of one missing value in labor force status across this observation period, which corresponded to 23.1% of the resulting sample. We then performed a highly conservative strategy to impute these missing values using multivariate imputations by chained equation (see the second page in Supplementary Material for a detailed explanation of our imputation strategy). After applying both selection criteria, the resulting research sample comprised 3,618 individuals.

Variables

The key variable to analyze later-life employment trajectories is *labor force status*, which has seven mutually exclusive indicators: (i) *working full-time*, indicating a full-time job; (ii) *working part-time*, indicating a part-time job; (iii) *out of the labor force*, indicating people out of paid employment and not looking for a new job; (iv) *retired*, indicating people completely retired from the labor force; (v) *partly retired*, indicating people who receive pension benefits but continue working at least partially in the labor force; (vi) *disabled*, indicating individuals with a disability; and (vii) *unemployed*, indicating people out of paid employment and looking for a new job. Labor force status was a variable requested in each of the survey waves analyzed, which made it possible to reconstruct employment trajectories across the observation period of interest.

The main two covariates in this research are *types of later-life employment trajectories* (constructed through a technique explained in the method subsection below) and *welfare state regime*, which includes the following indicators: *corporatist*, for Austria, Belgium, France and Germany; *liberal*, for Chile and the US; *liberal-corporatist*, for England (the biggest country in the UK) and Switzerland; *southern*, for Italy and Spain; and *social-democratic*, for Denmark and Sweden.

The main dependent variables are two health indicators, both measured in the last year of the observation period. The selection of two indicators rather than one was intended to facilitate the comparison of a subjective and an objective health measure. The first indicator, the subjective

health measure, is *poor self-rated health*. Poor self-rated health is a binary variable drawn from a five-level health scale asking individuals to rate their own health according to the following indicators: poor, fair, good, very good, and excellent. The specific values of the *poor self-rated health* variable are: 'No' (meaning good, very good, or excellent health) and 'Yes' (meaning poor or fair health).

The second health indicator, our objective health measure, is *number of chronic conditions*. Information about chronic conditions is collected through questions about whether a doctor has ever reported the respondent to have any of the following six chronic diseases: high blood pressure or hypertension, diabetes or high blood sugar, cancer or a malignant tumor, a stroke or transient ischemic attack, chronic lung disease, or arthritis or rheumatism. *Number of chronic conditions* is a variable with four possible values: '0 chronic conditions', '1 chronic condition', '2 chronic conditions', and '3 or more chronic conditions'.

For our analyses of the association between later-life employment trajectories and subsequent health outcomes, we added control variables measured at the baseline year of the observation period: namely, *education* (primary, secondary and tertiary), *age*, *gender*, and two health indicators: *baseline poor self-rated health* ('No' = good, very good, or excellent health / 'Yes' = poor or fair health), and *baseline number of chronic conditions* ('0 chronic conditions', '1 chronic condition', '2 chronic conditions', and '3 or more chronic conditions').

Methods

To reconstruct individuals' later-life employment trajectories, we used a longitudinal technique called sequence analysis. First, this tool organized the individual sequences of labor force statuses experienced chronologically by each individual during the five years before and the five years after the FPA. As described in the first page in Supplementary Material, this 10-year period is analyzed

across five waves of the ELSA, HRS, and SHARE surveys and four waves of the EPS survey.

Second, this technique allowed us to identify similarities between every pair of individual sequences. Two individual sequences were considered similar if both comprised similar types of labor force statuses, similar orders of the labor force statuses, and similar timings of transitions between labor force statuses. The comparison of similarities between every pair of individual sequences led to the creation of a *distance matrix* summarizing the modifications or ‘costs’ (substitution and/or insertion/deletion costs) needed to convert one sequence to another. To measure distances between individual sequences, we employed the optimal matching analysis (OMA) method, as this considers both substitution and insertion/deletion costs, which is necessary when working with sequences of different lengths (Gabadinho, Ritschard, Mueller, & Studer, 2011). By contrast, other distance measurement methods, such as the dynamic and generalized hamming distance methods, work only over sequences with exactly equal lengths (Lesnard, 2006).

We next conducted a hierarchical cluster analysis on the created distance matrix to group together similar individual trajectories. To accomplish this, we used Ward’s (1963) hierarchical cluster method. When using this clustering method, it is important to decide on the most appropriate and informative number of types of trajectories, which, in our study, represent the number of types summarizing the diversity of employment patterns experienced by people around the FPA. To determine this, we used an index called *average silhouette width* (ASW), which ranges from zero to one for different numbers of clusters (or types), with an index score closer to one indicating greater robustness (Kaufmann & Rousseeuw, 1990).

Once we determined the most appropriate number of types of employment trajectories, we measured the interaction effects between these trajectory types and welfare state regimes on the two health outcomes of interest—that is, *poor self-rated health* and *chronic conditions*—using logistic regressions and multinomial logistic regressions, respectively. All models were adjusted using the above-mentioned control variables. We also always used the most prevalent category as the

reference category for both dependent variables and covariates.

All the analyses in this study were performed using the statistical software R (R Core Team, 2018): specifically, the packages *TraMineR* (Gabadinho et al., 2011) for sequence analysis, *glm* for logistic regressions, *nnet* (Ripley & Venables, 2002) and *effects* (Fox & Hong, 2009) for multinomial logistic regressions, and *mice* (van Buuren & Groothuis-Oudshoorn, 2010) for multivariate imputation by chained equations.

Results

Later-life employment trajectories

Figure 1 shows the results of the ASW index. As seen, the five-type solution seems to be the best option, as it yields the highest ASW value. This means that five types adequately summarize the variety of employment trajectories followed by 3,618 individuals from 12 different countries around their gender- and country-specific FPAs.

-Figure 1 here-

Figure 2 shows the five types of possible employment trajectories around the FPA. On the right-hand side are the seven labor force statuses used to examine individuals' employment paths. The left-hand side indicates the name of each type and the proportion of people classified in each type. The x-axis of types corresponds to the time period analyzed (i.e., the 10-year period between five

years before the FPA and five years after the FPA), while the y-axis indicates the percentage of individuals classified in different labor force statuses within every type at each time point.

-Figure 2 here-

The first type, *early retirement*, is the most prevalent employment path, followed by 45.2% of individuals. Here, most individuals begin to retire from the labor force five years before the FPA and remain in this status until the end of the observation period. The second type, *conventional retirement*, is the employment trajectory followed by 30.2% of the sample and illustrates the normative and traditional retirement transition, consisting of retiring from full-time work at the FPA. The third type, *predominantly part-time* (8.5%), indicates individuals working mostly in part-time positions and beginning to retire at the FPA. The fourth type, *not in the labor market*, representing 8.5% of the sample, reflects those individuals who are permanently out of the labor force (i.e., without employment and not looking for a new job) and move to retirement beyond the FPA. The fifth type, *partial retirement* (7.6%), comprises people gradually retiring from the labor force: that is, people combining pension income with some degree of work and postponing the moment of complete retirement for later ages.

Table 1 shows descriptive statistics for the five types of later-life employment trajectories. As seen, women are clearly the majority in those types involving partial or no attachment to the labor market: that is, the *predominantly part-time* and *not in the labor market* trajectories. Less educated individuals are concentrated in the *not in the labor market* trajectory, and more educated individuals are concentrated in the *partial retirement* trajectory. In terms of welfare state regime, only 39.6% of people from liberal countries belong to the *early retirement* trajectory, while 59.9% and 64.5% of individuals from southern and corporatist countries follow this path, respectively. Furthermore,

25.7% of people from southern states belong to the *not in the labor market* trajectory, and 22.5% of individuals from liberal-corporatist countries follow the *predominantly part-time* trajectory.

Regarding health indicators (measured at the last observation point), we observe a lower prevalence of poor self-rated health among people following the *predominantly part-time* and *partial retirement* trajectories and a higher prevalence among people following the *early retirement* and *not in the labor market* trajectories. Furthermore, with respect to chronic conditions, people in the *predominantly part-time* trajectory have, on average, fewer chronic diseases, while people in the *early retirement* and *partial retirement* trajectories have more.

-Table 1 here-

Later-life employment trajectories and health in different welfare state contexts

Next, we aim to understand how types of later-life employment trajectories and welfare state regimes are associated with two subsequent health outcomes: self-rated health and chronic conditions. Tables 2 and 3 show the predicted probabilities (with 95% confidence intervals) from the logistic regression model for poor self-rated health and the multinomial logistic regression model for chronic conditions, respectively. In Tables 2 and 3, we show only the results of the interaction effects between types of later-life employment trajectories and welfare state regimes. The models are adjusted for control variables. To complement the predicted probabilities results, in Supplementary Tables 2 and 3, we present the results of both regression models, but with odds ratios.

Table 2 indicates that the probability of suffering poor self-rated health five years after the FPA for individuals following an *early retirement* trajectory is lower in corporatist (0.33) and in liberal-corporatist countries (0.29). However, there are not statistically significant differences among welfare state regimes, as their confidence intervals (CIs) overlap. We observe a different scenario for

the *conventional retirement* trajectory, for which probabilities of poor health are higher for liberal (0.32) than liberal-corporatist (0.17) states, with the rest of the countries, nevertheless, showing no significant differences. Next, for those people following a *predominantly part-time* trajectory, individuals in liberal-corporatist countries (0.15) again have a lower likelihood of reporting poor health, however, as all CIs overlap, there is no statistically significant difference among welfare states. We therefore do not find enough support for our fourth hypothesis, which assumed that in liberal-corporatist countries individuals working part-time beyond the FPA have better health outcomes than in other countries.

Regarding individuals classified in the *not in the labor market* trajectory, the highest probabilities of suffering poor health are in liberal countries (0.46), and the lowest are in liberal-corporatist states (0.17). These differences are statistically significant. These findings are in line with our second hypothesis, which states that individuals in liberal countries experience the worst health outcomes mainly if they are out of the labor force before retiring. The outcomes are similarly poor in southern countries, which confirms our fifth hypothesis: that those weakly attached to the labor force experience the greatest adversities in terms of health.

Finally, among people following a *partial retirement* trajectory, we observe, again, a lower chance of suffering poor health for those living in corporatist and liberal-corporatist states; however, in this case, the differences are not statistically significant.

-Table 2 here-

A different situation is observed in the model on predicted probabilities of chronic conditions (Table 3). Focusing on the estimations for '2 chronic conditions' and '3 or more chronic conditions', we observe that the higher probabilities are concentrated among trajectories in liberal and liberal-

corporatist welfare states. Specifically, the results for the '3 or more chronic conditions' model show that, whereas probabilities among individuals following the *early retirement* trajectory are 0.25 in liberal countries and 0.22 in liberal-corporatist countries, the probabilities in corporatist, social-democratic, and southern nations are 0.05, 0.07, and 0.04, respectively. Similarly, for the same model, probabilities for those following a *conventional retirement* trajectory are 0.23 in liberal states and 0.18 in liberal-corporatist countries, while they are 0.02, 0.02, and 0.01 in corporatist, social-democratic, and southern nations, respectively. The differences between liberal and liberal-corporatist countries and the rest of the welfare state types are statistically significant. Then, focusing on the trajectories *predominantly part-time, not in the labor market*, and *partial retirement*, we see that their probabilities of confronting '3 or more chronic conditions' are always higher especially in liberal states (0.27, 0.21, and 0.28, respectively).

When examining the estimations for '0 chronic conditions', we consistently observe that trajectory types in corporatist, social democratic, and southern nations have the highest probabilities. It is particularly interesting that, among those following the *early retirement* trajectory, the chances of reporting zero chronic conditions in both liberal and liberal-corporatist nations are 0.08, while in corporatist, social democratic and southern states, the probabilities are 0.30, 0.31, and 0.25, respectively (statistically significant differences). This finding supports our first hypothesis, which assumed that social-democratic countries produce the best health outcomes for individuals in early retirement paths. Yet the social-democratic countries do not stand out as the only countries with high levels of zero chronic conditions: corporatist and southern countries have similar levels.

A similar situation is observed for people following the *conventional retirement, predominantly part-time*, and even the *not in the labor market* trajectories. For instance, for individuals in the *conventional retirement* path, probabilities in liberal and liberal-corporatist nations are 0.15 and 0.14, respectively, while those in corporatist, social democratic, and southern countries are 0.34, 0.27, and 0.38, respectively. This result supports our third hypothesis—that individuals following

conventional retirement paths experience the best health outcomes in corporatist countries with generous but not universal retirement benefits as compared to other countries. While it is true that individuals in conventional retirement pathways experience good health outcomes in corporatist countries, it is not true that they experience the best health outcomes in this welfare state regime. They experience even better outcomes in southern countries and almost equally good outcomes in social democratic countries.

-Table 3 here-

We ran all the analyses (sequence analyses and regression models) stratified by gender; however, in most cases, we observed non-significant results, and in a few cases, we observed exceptionally large size effects due to the small sample size when working separately with male and female samples (see Supplementary Figure 2 and Supplementary Tables 4, 5, 6, and 7). Therefore, we focus on results over the pooled-gender sample.

Discussion

Our analysis identifies the following five types of later-life employment trajectories: *early retirement*, *conventional retirement*, *predominantly part-time*, *not in the labor market*, and *partial retirement*. The *early retirement* trajectory is the most prevalent across all countries, reflecting a general trend toward early retirement between the 1970s and the 2000s: a trend that has since halted and even increasingly reversed (Hofäcker & Radl, 2016). In liberal, corporatist, liberal-corporatist, and social-democratic countries, the *conventional retirement* trajectory is the second-most prevalent, while in southern countries, the *not in the labor market* trajectory is the second-most common. This latter

result may be explained by southern European countries' strong reliance on family, which compensates for the absence of welfare state provisions. In addition, this may reflect the rather large informal (i.e. tax-free) sectors of southern welfare states (Moreno, 2000).

The high prevalence of the conventional retirement pathway and its positive association with health may be explained by the social norm of retirement age. Previous research has shown that individuals seem to have a preference to retire at an expected age and at the same time as their peers (Jansen, 2018). It has, for instance, been shown that spouses align their retirement timing (Moen, Kim, & Hofmeister, 2001). This allows individuals to spend the leisure time gained through retirement with their significant others. Interestingly, our analysis shows that the positive association between conventional retirement and positive health outcomes does not only exist in corporatist countries where conventional retirement is widespread – as we expected – but also in social-democratic and southern countries. This indicates that, especially in these types of countries, individuals who are able to stay in 'standard' occupational careers with few interruptions and full-time employment – typically men – are rewarded in terms of their health outcomes.

Our finding that individuals in liberal and southern countries experience poor self-rated health if they are weakly attached to the labor force is in line with the previous literature (Simó Noguera, Castro Martin, & Soro Bonmati, 2005). Three potential explanations have been proposed: first, a lack of financial resources and an absence of comprehensive benefits for individuals not in the labor force – an explanation that is based on findings of precarious employment situations (self-employment, short-term contracts) in southern countries (Simó Noguera et al., 2005); second, liberal and southern welfare states, as well as early withdrawals from the labor market, are traditionally associated with poorer health (Jokela, Head, Vahtera, Westerlund, & Marmot, 2010); and third, individuals in poor health might self-select into premature exits from the labor force (Rohwedder & Willis, 2010). This last possibility is the least likely, however, as our regression models

control for baseline self-rated health and baseline chronic conditions. We therefore assume that self-selection bias does not affect our results.

Our results contribute to the literature on the typology of welfare regimes initiated by Esping-Andersen (Esping-Andersen, 1990). While Esping-Andersen focused mainly on individuals' status in the labor market and their financial situation, we go one step further and examine individuals' health outcomes. We provide support for the argument that the level of de-commodification of employment does affect individuals' health: countries with higher levels of de-commodification, particularly social democratic countries, seem to protect individuals better from poor health in old age. Old-age pension benefit generosity or universal access to health care may not only allow individuals with adverse health to retire early from employment – independent of their private savings – but also provide them with access to health services (Brennenstuhl et al., 2012; Fritzell & Lundberg, 2007; Lundberg et al., 2008). In contrast, in countries with low levels of de-commodification, particularly liberal countries, individuals with poor financial resources seem to be constrained to work longer – independent of their health status – and may be deprived of access to health care services (Polivka & Kwak, 2008).

By focusing on the interaction between welfare state regimes and later-life employment trajectories, we extend the previous literature on the effect of welfare regimes on population health (Fritzell & Lundberg, 2007). We show how the contextual factors together with later-life labor market experiences shape health outcomes around age 70 by highlighting, for instance, that early retirement does not have the same effect in all types of welfare regimes. In contrast to a study by Worts et al. (2016) that used a comparative approach to gendered later-life employment trajectories, we include a larger set of countries and focus on health as an outcome. Thus, we provide novel insights on the complex associations between welfare state regimes, later-life employment trajectories and health.

The main strength of this study is the use of a novel and longitudinal dataset, allowing a comparative analysis across 12 countries of older adults' labor market experiences in the period of time leading up to, and after, country- and gender-specific retirement ages. Moreover, our methodological approach allowed us to capture the full range of experiences in this life course domain, including 'unconventional patterns' of people with weak or no attachment to the labor market prior to retirement. Furthermore, our dataset encompasses countries belonging to all of the five types of welfare states described.

A limitation of our study is the focus on the aggregated level of welfare states. Consequently, we do not provide an analysis of the heterogeneous conditions of pension systems across these countries. Countries belonging to the same welfare state type may differ substantially in terms of the income replacement rates of old age pensions. For instance, while the future net replacement rate for an average earner who entered the labor market in 2016 amounts to 56% in Sweden, it is 86% in Denmark (OECD, 2017). Our analysis does not capture this within-regime heterogeneity, nor fully account for the variation in access to welfare resources across the countries included in the study. Second, by using a theory-driven typology, countries that are similar in some respects but very different in others are necessarily grouped together.

Another limitation of the study may be a potential self-selection bias into later-life employment trajectories based on factors such as education or occupation. Previous literature suggests, for instance, that individuals with higher levels of education are more likely to retire late than those with lower levels of education (Fisher, Chaffee, & Sonnega, 2016). At the same time, the positive relationship between education and health is well established (Johnson, Staff, Schulenberg, & Patrick, 2016; Zajacova et al., 2014). Our finding that highly educated workers were concentrated in the *partial retirement* trajectory, characterized by later full retirement relative to the other trajectories, and that we find a lower prevalence of poor self-rated health among this group, may be an indicator for self-selection mechanisms being present. In other words, individuals with higher

levels of education may be more likely to retire partially and to experience good health – not because of a causal effect of the trajectory on health but because of the simultaneous effect of education on both the trajectory and the health outcome. Future research might examine potential selection issues identifying the factors determining selection into different types of trajectories.

An important policy implication of our analysis is that the generosity of welfare benefits crucially affects individuals' health in old age. This is particularly relevant in the context of extended working lives where individuals are incited to work longer. Policies that extend working lives thus have to consider the conditions in which individuals have to continue working. Policies promoting lifelong learning or universal health care may, for instance, create conditions under which working life extension has less adverse effects on individuals in old age. Policies to promote a prolongation of working life thus should consider potential effects on further exacerbating health inequalities among older individuals. While we did not focus on these types of policies in the present study, the importance of health care policies for older individuals' health should not be neglected: access to universal health care is not only relevant for older individuals (Polivka & Kwak, 2008) but across the entire life course.

Conclusion

This research sheds light on the complex interactions between different aspects of the welfare state—specifically, the configuration of the pension, employment, health care and family systems—and health in old age. Among other findings, our analyses indicate that early exits from the labor market are associated with better health outcomes in old age in social-democratic and corporatist countries, but not in liberal and liberal-corporatist countries. This suggests that this association may only hold in the context of generous social security, which may imply that the type of the welfare state, and the extent to which it de-commodifies work, affect health outcomes in old age more strongly than later-life employment patterns.

Our study contributes to the literature arguing that the generosity of welfare benefits promotes health in old age. At the same time, by extending research to the association between later-life employment and subsequent health in countries characterized by different welfare state regimes, our findings substantially contribute to the debate surrounding potential policy responses to population aging. Health in old age is the result of a plethora of policies from health care to pension benefits; of crucial importance to prevent adverse health in old age seems to be the generosity of these policies and potentially its provision across the entire life course.

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Table 1. Descriptive statistics of types of later-life employment trajectories

	Early retirement	Conventional retirement	Predominantly part-time	Not in the labor market	Partial retirement
N	1,634	1,094	309	307	274
%	45.2	30.2	8.5	8.5	7.6
Female (% column)	54.2	48.9	80.3	95.4	51.1
Education (% column)					
Primary education	37.2	30.6	27.5	62.2	17.2
Secondary education	37.6	35.2	33.7	29.0	40.5
Tertiary education	25.2	34.2	38.8	8.8	42.3
Welfare state type (% row)					
Liberal	39.6	37.7	2.5	10.0	10.3
Corporatist	64.5	16.9	10.9	4.7	3.1
Liberal-Corporatist	38.3	29.6	22.5	4.5	5.2
Social-Democratic	49.8	29.7	9.3	0.4	10.8
Southern	59.9	8.6	4.5	25.7	1.5
Poor self-rated health (% column)					
Yes	38.7	27.6	21.7	50.2	18.2
No	61.3	72.4	78.3	49.8	81.8
Chronic conditions (% column)					
0 chronic conditions	21.2	30.3	32.7	30.6	20.4
1 chronic condition	29.6	28.5	33.0	28.7	25.5
2 chronic conditions	22.3	22.4	21.4	24.4	26.6
3+ chronic conditions	26.9	18.7	12.9	16.3	27.4

Note: Poor self-rated health and chronic conditions measured in the last observation year.

Table 2. Predicted probabilities for poor self-rated health

	Liberal	Corporatist	Liberal- Corporatist	Social- Democratic	Southern
Early retirement	0.38 [0.34-0.43]	0.33 [0.28-0.39]	0.29 [0.24-0.35]	0.39 [0.30-0.49]	0.39 [0.31-0.48]
Conventional retirement	0.32 [0.28-0.36]	0.19 [0.12-0.30]	0.17 [0.12-0.23]	0.22 [0.13-0.35]	0.29 [0.14-0.52]
Predominantly part-time	0.34 [0.20-0.51]	0.30 [0.19-0.44]	0.15 [0.10-0.22]	0.25 [0.10-0.50]	0.37 [0.14-0.67]
Not in the labor market	0.46 [0.37-0.54]	0.15 [0.05-0.39]	0.17 [0.08-0.33]	0.00 [0.00-1.00]	0.44 [0.32-0.57]
Partial retirement	0.23 [0.16-0.30]	0.18 [0.06-0.45]	0.16 [0.07-0.33]	0.26 [0.12-0.49]	0.30 [0.04-0.81]

Note: Poor self-rated health measured in the last observation year. Only predicted probabilities of interaction effects between types of later-life employment trajectories and welfare state regimes are shown. Model adjusted for age, gender, education, poor self-rated health in baseline year, and chronic conditions in baseline year. In brackets 95% confidence intervals are shown.

Table 3. Predicted probabilities for chronic conditions

	Liberal	Corporatist	Liberal-Corporatist	Social-Democratic	Southern
0 Chronic conditions					
Early retirement	0.08 [0.06-0.11]	0.30 [0.25-0.36]	0.08 [0.06-0.11]	0.31 [0.23-0.40]	0.25 [0.18-0.32]
Conventional retirement	0.15 [0.12-0.18]	0.34 [0.24-0.46]	0.14 [0.10-0.19]	0.27 [0.19-0.38]	0.38 [0.19-0.61]
Predominantly part-time	0.08 [0.02-0.24]	0.36 [0.24-0.51]	0.14 [0.10-0.19]	0.44 [0.25-0.66]	0.21 [0.07-0.49]
Not in the labor market	0.13 [0.09-0.19]	0.51 [0.29-0.73]	0.12 [0.05-0.25]	0.00 [0.00-0.00]	0.24 [0.15-0.36]
Partial retirement	0.08 [0.05-0.13]	0.31 [0.13-0.58]	0.19 [0.10-0.33]	0.35 [0.20-0.54]	0.47 [0.10-0.87]
1 Chronic condition					
Early retirement	0.33 [0.28-0.37]	0.48 [0.43-0.54]	0.34 [0.28-0.40]	0.41 [0.33-0.51]	0.55 [0.47-0.63]
Conventional retirement	0.30 [0.26-0.34]	0.37 [0.27-0.49]	0.35 [0.28-0.43]	0.46 [0.34-0.57]	0.47 [0.27-0.68]
Predominantly part-time	0.42 [0.26-0.60]	0.44 [0.30-0.58]	0.38 [0.30-0.47]	0.25 [0.11-0.48]	0.39 [0.15-0.70]
Not in the labor market	0.28 [0.21-0.36]	0.43 [0.23-0.65]	0.38 [0.22-0.56]	0.00 [0.00-0.00]	0.45 [0.33-0.58]
Partial retirement	0.25 [0.18-0.33]	0.37 [0.17-0.63]	0.45 [0.29-0.61]	0.48 [0.31-0.67]	0.53 [0.13-0.90]
2 Chronic conditions					
Early retirement	0.34 [0.30-0.39]	0.17 [0.13-0.22]	0.37 [0.30-0.43]	0.21 [0.14-0.30]	0.16 [0.11-0.23]
Conventional	0.33	0.27	0.33	0.25	0.14

retirement	[0.29-0.37]	[0.17-0.40]	[0.26-0.40]	[0.15-0.38]	[0.04-0.38]
Predominantly	0.23	0.16	0.37	0.26	0.27
part-time	[0.12-0.39]	[0.07-0.32]	[0.29-0.46]	[0.11-0.50]	[0.07-0.65]
Not in the labor market	0.38	0.04	0.31	0.00	0.29
	[0.30-0.47]	[0.01-0.25]	[0.17-0.51]	[0.00-0.00]	[0.18-0.42]
Partial retirement	0.38	0.32	0.32	0.17	0.00
	[0.31-0.47]	[0.12-0.62]	[0.17-0.51]	[0.06-0.38]	[0.00-0.00]
3 or more chronic conditions					
Early retirement	0.25	0.05	0.22	0.07	0.04
	[0.21-0.29]	[0.03-0.08]	[0.17-0.28]	[0.04-0.12]	[0.02-0.08]
Conventional retirement	0.23	0.02	0.18	0.02	0.01
	[0.19-0.27]	[0.01-0.09]	[0.12-0.25]	[0.00-0.09]	[0.00-0.12]
Predominantly	0.27	0.04	0.11	0.04	0.14
part-time	[0.15-0.42]	[0.01-0.15]	[0.06-0.18]	[0.01-0.26]	[0.02-0.59]
Not in the labor market	0.21	0.02	0.19	0.99	0.03
	[0.14-0.29]	[0.00-0.15]	[0.08-0.39]	[0.99-0.99]	[0.01-0.09]
Partial retirement	0.28	0.00	0.05	0.00	0.00
	[0.22-0.36]	[0.00-0.00]	[0.01-0.18]	[0.00-0.00]	[0.00-0.00]

Note: Chronic conditions measured in the last observation year. Only predicted probabilities of interaction effects between types of later-life employment trajectories and welfare state regimes are shown. Model adjusted for age, gender, education, poor self-rated health in baseline year, and chronic conditions in baseline year. In brackets 95% confidence intervals are shown.

Captions for Figures

Figure 1. Average silhouette width index

Figure 2. Five types of later-life employment trajectories

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Figure 1

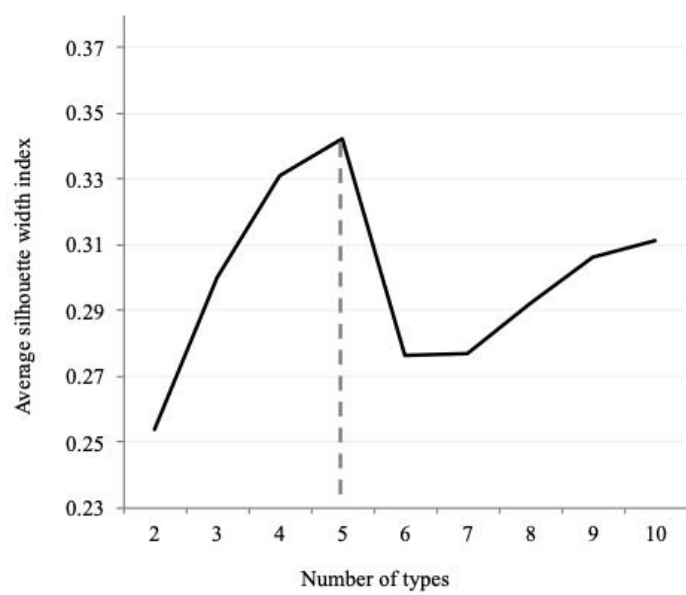


Figure 2

